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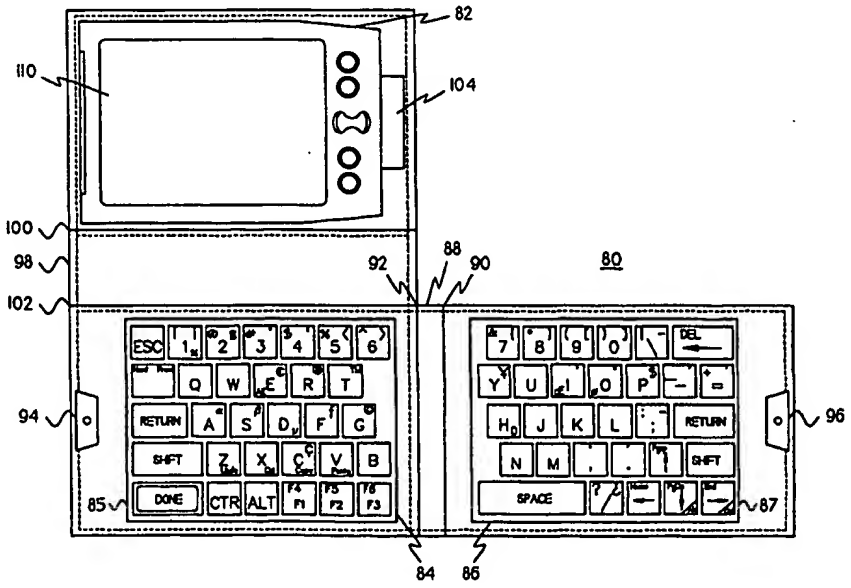

(57) Abstract

A keyboard/case for a computer comprising a case having a keyboard section and a computer section, with the keyboard section and the computer section divided by a hinged member, with a mount for attaching the computer to the computer section and at least one keyboard mounted on the keyboard section, with the keyboard section in electrical communication with the computer when the computer is mounted on the computer section.

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KEYBOARD/CASE FOR HAND HELD COMPUTERS

RELATED APPLICATIONS

This application claims priority of a U.S. provisional application Serial No. 60/097,374, inventor Thomas Weishaar, entitled KEYBOARD/CASE FOR HAND HELD COMPUTERS

FIELD OF INVENTION

The present invention relates to hand held computers including those referred to as palm PCs. More specifically, the present invention relates to portable keyboards and protective cases for hand held computers.

BACKGROUND OF THE INVENTION

Personal computers have continued to benefit from the reduction in component size and density of components that can now be manufactured on integrated circuits (IC) and circuit boards. This has allowed the progression from desktop computers to portable computers to notebook computers to hand held computers. One type of hand held computer is commonly referred to as the palm PC type of computer (or palm computer). Examples of these include the PALM PILOT™, PALM III, PALM IIIX, PALM V, PALM VII by 3COM™, the NINO™ by Phillips as well as other devices that run the WIN CE operating system by Microsoft Corporation. Devices such as the PALM PILOT™ use a touch screen and stylus, instead of a conventional keyboard. The most common way of entering text is through hand writing recognition programs, such as GRAFFITI® by 3COM™. Text is written on the touch screen and then interpreted by the hand writing recognition software. A "virtual" keyboard is usually included that can be accessed using the stylus. Because the virtual keyboard appears on the touch screen, it is necessary to "hunt and peck" with the stylus in order to type on the virtual keyboard. An attached "physical" keyboard is not provided with or a part of these palm PCs. A physical keyboard can be connected via a serial port if a serial port is provided.

Hand writing recognition using the touch screen and stylus, or the virtual keyboard and stylus, can be slow and cumbersome to many users. This can be

particularly true to those used to working on a keyboard or those who have larger amounts of data to enter into their palm PC device.

One of the benefits of the palm PC's is their small size. Devices such as the PALM PILOT™ have dimensions of approximately 5 inches by 3 ½ inches, with a height/depth of approximately 5/8 of an inch. The standard carrying case for such devices adds only minimal amounts to these dimensions. In this way, these devices are very portable, easily fitting within a pocket, pocket book, brief case and other carrying accessories.

Palm PC's, such as the PALM PILOT™ generally have an input/ output means, such as a serial port, for communicating between the palm PC and another computer, such as a desktop or notebook computer. This communication port, although primarily designed for synchronizing with another computer, is not limited for this purpose alone.

Although the Palm PC's have a communication port, existing keyboards would be very cumbersome to use with a hand held computer because of their size. A keyboard that is substantially larger than a palm PC device would defeat the benefits of the small, compact dimensions which allow for its ease of portability.

Most notebook computers and certain handheld computers/organizers have an integrated keyboard that is part of a clamshell design, folding over the screen portion of the computer. These computers are generally not detachable from the computer to allow the computer to be used without the keyboard. These computers are also generally larger, in at least one dimension than the palm PC type computers, in part because of the limitation of the keyboard size. With respect to the handheld computers/organizers, the keys are often very small, far from the size of a standard keyboard, making typing difficult. Even with the reduced size of the keyboard, the keyboard often dictates a larger computer than the palm PC type computers.

SUMMARY OF THE INVENTION

The present invention involves a keyboard/case for a computer comprising a case having a keyboard section and a computer section, with the keyboard section and the computer section divided by a hinged member. A mount is provided for attaching the

computer to the computer section. At least one keyboard is mounted on the keyboard section, with the keyboard in electrical communication with the computer when the computer is mounted on the computer section.

In an exemplary embodiment, the keyboard/case of the present invention is used with a palm computer.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention, as well as other features and advantages thereof, will now be described by way of non-limiting example with reference to the following figures in which:

Fig. 1 is a plan view of an exemplary embodiment of the present invention;

Fig. 2 is a plan view of the present invention when folded around a palm PC;

Fig. 3 is a plan view of a slide out connector used in connection with the present invention;

Fig. 4 is a plan view of a rail used in connection with the slide out connector shown in Fig. 3;

Fig. 5 is a plan view of a adapter for a slide out connector such as that shown in Fig. 3 that can be used with an exemplary embodiment of the present invention;

Fig. 6 is a plan view of an additional exemplary embodiment of the present invention;

Fig. 7 is an operation view of a slide out connector used with the exemplary embodiment of the present invention shown in Fig. 6;

Fig. 8 is a plan view of the connector shown in the exemplary embodiment of the present invention shown if Fig. 6 and Fig. 7;

Fig. 9 is a perspective view of a connector used in the exemplary embodiment of the present invention;

Fig. 10 is an additional exemplary embodiment of the present invention;

Fig. 11 is a plan view of the exemplary embodiment of the present invention shown in Fig. 10 in its closed position;

Fig. 12 is a prospective view of an additional exemplary embodiment of the present invention;

Fig. 13 is a top view of an exemplary embodiment of the present invention;

Fig. 14 is crossectional view of a mounting bracket that is a part of an exemplary embodiment of the present invention

Fig. 15 is a top view of view of a mounting bracket, showing the mounting bracket in phantom with a PC board exposed;

Fig. 16 is an exploded view of an exemplary mounting bracket section of the present invention;

Fig. 17 is an exploded view of a keyboard and underlying layers used in an exemplary embodiment of the present invention;

Fig. 18 is a flow chart illustrating the process of the control circuitry of an exemplary embodiment of the present invention; and

Fig. 19 is pseudo for the driver of an exemplary embodiment of the present invention.

DETAILED DESCRIPTION

There is shown in Fig. 1 a keyboard/case 10, which is an exemplary embodiment of the present invention. Keyboard/case 10 contains left keyboard section 12 and right keyboard section 14. Each of these keyboard sections contains keypads or keyboards in a generally standard keyboard or QWERTY keyboard layout. Additional special function keys 34 may also be included. Special function keys 34 may be user definable as permitted by software. Examples of special function keys are keys, 30 and 32, which can be assigned functions corresponding to particular hand writing recognition strokes on a touch pad of palm PC, such as the PALM PILOT™. For example, special function key 30 corresponds to the Command function of the Palm Pilot and special function key 32 corresponds to the shortcut key function. Other types of computers,

examples of which are commonly referred to as Personal Digital Assistants (PDA), Personal Information Managers (PIM) and handheld computers can be used with the present invention. In an additional embodiment (not shown) a wireless telephone or a smart telephone can be used instead of a computer/palm PC. A smart telephone is a telephone having functionality beyond that of a telephone and may incorporate some or all of the functionality of a palm PC.

Keyboard/case 10 also includes fold 16 and 18, which define a central section 17 between folds 16 and 18. A hinged closure 20 includes a fold 21 and second fold 23. In addition, hinged closure 20 includes a sealing tab 22. Folds 16, 18, 21, and 23 can be made as a stamped fold in a vinyl or plastic piece. In addition, they can take the form of hinges or other structures that allow movement about the access defined by the fold. In an exemplary embodiment, sealing tab 22 is a hook and loop closure material known as VELCRO™. Other sealing means can be used such as snaps, hooks, tabs as will be understood by those skilled in the art. A corresponding mating structure for sealing tab 22 is located on the backside of keyboard/case 10 (not shown). Keyboard/case10 can be made of many materials such as leather, plastic, vinyl, nylon and metal for example.

A slide out connector 24 allows for connection of keyboard/case 10 with a palm PC device. Slide out connector 10 is designed to connect with the serial connector of the PALM PILOT™, in an exemplary embodiment of the present invention. For this exemplary embodiment, slide out connector 24 thus connect with a 10 pin serial connector. The particular dimensions and characteristics of slide out connector 24 are tied to the particular palm PC or hand held computer for which keyboard/case 10 is being designed.

Slide out connector 24 slides into recess or slot 26 (which may also be a cartridge) when not in use. A wire bundle 28 provides electrical communication between the keys of left and right keyboard sections 12 and 14 with slide out connector 24. Wire bundle 28 is not visible in an exemplary embodiment, as it would be located within keyboard/case10. It is shown in Fig. 1 for illustrative purposes.

In an exemplary embodiment, keyboard/case 10 has a width of approximately 3 ¾ inches and a length of approximately 12 inches when unfolded. This provides a reasonable typing area. In order for keyboard/case 10 to be compact, a membrane style keyboard may be used. High precision Swiss Dome keys can be used to provide positive tackle feedback for the user. Membrane keypads will be understood by those skilled in the art and are commonly found on devices such as for example, calculators.

There is shown in Fig. 2 a keyboard/case 10 in its folded position around a palm PC 36 such as the PALM PILOT™. The embodiment shown in Fig. 1 and Fig. 2 shows keyboard/case 10 folded about the longest dimensions of palm PC 36. It is within this scope of the present invention that keyboard/case 10 can also be folded around the width dimension of a palm PC.

Connector 24 is also shown in Fig. 3 to illustrate an exemplary retractable design. Connector 24 can be activated to its slide out position by pulling it out of slot 26. To maintain the compact size of the present invention, connector 24 can fit in the thickness or substantially in the thickness of keyboard/case10. In an additional embodiment, slide out connector 24 can be mounted on the bottom surface of keyboard/case 10 as shown in Fig. 3.

Fig. 4 shows exemplary rails 38 and 40 which serve as slides for slide out connector 24 as its slides into and out of slot 26 or connector housing 25.

There is shown in Fig. 5 an adapter 42. Adapter 42 can be used to mate connector 24 with the communication port of another palm PC or hand held computer. In this way, keyboard/case 10 can be produced for a particular palm PC, such as the PALM PILOT™ and still be used with other palm PC's or hand held computers. If each palm PC uses a different type or layout for the communication port, a separate adapter would be required for each such palm PC.

There is shown in Fig. 6 an additional embodiment of the present invention. In this embodiment, keyboard/case 10 includes piping 44 which will serve as a side seal when keyboard/case10 is in its closed position, wrapped around a palm PC. In addition, the embodiment shown in Fig. 6 shows connector 24 mounted to a track 46.

Slide out connector 24 moves along track 46 from position (A) when not use through position (B) to position (C) when in use. Additionally, slide out connector 24 can retract to either position (A) or position (B). Slide out connector 24 is attached to and moves along track 46 with pins 48 and 50. When positioning slide out connector 24 for use at position (C), pin 50 slides into track section 47 so that slide out connector 24 is positioned appropriately to mate with a palm PC.

Fig. 7 is an enlarged view of the track mechanism shown in Fig. 6. Wire 28 is connected to slide out connector 24 with a grommet 52 to protect wire 28 and seal connector 24. Securing tabs 54 are shown in this exemplary embodiment and correspond to the indentations that are a part of the communication port of the PALM PILOT™. The indentations of the PALM PILOT™ are for securing connectors for communicating with the PALM PILOT™. Other securing means can be used that correspond to a particular palm PC or hand held device, as will be understood by those skilled in the art.

Fig. 8 is an additional view of connector 24 for the embodiment shown in Fig. 6 and Fig. 7. In an exemplary embodiment designed to mate with the PALM PILOT™, connector 24 has a length of approximately 7/8 of an inch and a width of approximately 5/8 of an inch. The height or depth of the connector is approximately 3/16 of an inch.

Fig. 9 shows a perspective view of connector 24, which in an exemplary embodiment is designed to mate with the serial communications port of a PALM PILOT™.

An additional exemplary embodiment is shown in Fig. 10. In this embodiment, a stand 60 is shown in both its folded and unfolded positions. Stand 60 is design to position a palm PC in an upright position, similar to the position of a standard desktop monitor in relation to the keyboard, or the position of a notebook computer monitor in relation to a notebook keyboard when in operation. Stand 60 includes legs 66 and 68, which when in the upright position will support a palm PC, when mounted to connector 24. In the upright position, hinges 62 and 64 are in their open positions. A slide out section 70 may be necessary to distance stand 60 significantly away for keyboard/case 10 to mount the palm PC to connector 24 for use. Wire bundle 28 is

connected to connector 24 either on or in extension piece 70. Piping 44 is also shown in this embodiment.

Fig. 11 shows piping 44 mating with complimentary section of piping 44 when keyboard/case 10 is in its closed position. Piping 44 thus acts as both sealing and cushioning means.

In Fig. 12, an additional embodiment of keyboard/case10 is shown using a zipper closure 72.

Fig. 13, shows an additional exemplary embodiment of the present invention. A keyboard case 80 is shown with a Palm 3 ™ Palm PC type of palm PC computer 82. Other types and examples of palm PC or handheld computer 82 (computer 82) can be used with the present invention, as will be understood by those skilled in the art. It may be necessary to modify various dimensions, fittings and connectors of the present invention to accommodate a specific computer 82.

Keyboard case 80 has two keyboard sections 84 and 86 which together, define a keyboard for entering data into computer 82. Separate keypad or keyboard 85 and 87, capable of producing electrical signals when the keys of the keyboards are depressed/released are mounted upon each keyboard section. Together the two keyboards 85 and 87 comprise a single alphanumeric keyboard. The number and associated characters for the keyboards can vary, depending upon the application, as well as the language of the user. In an exemplary embodiment, the keyboards are a membrane type keyboard made from Memtronics of Canada. Membrane keyboards are relatively flat and thin so keyboard case 80 does not become overly bulky when folded around a computer 82 as a case. Other membrane keyboards and other types of keyboards will be understood by those skilled in the art. Keyboard section 84 is separated from keyboard section 86 by central section 88 comprised of folds or hinges 90 and 92. In an exemplary embodiment, folds 90 and 92 are essentially a fabric hinge, using the fabric material, such as leather or vinyl as the hinge. Keyboard section 86 folds on top of keyboard section 84 and in this exemplary embodiment is secured via a fastening means. The fastening means in this exemplary embodiment is a snap closure comprised of a receiving section 94 and a protruding section 96. It will be understood by those skilled in the art that additional

fastening means, such as Velcro™ , magnets, snaps or zippers, can also be used. A second central section 98 is shown with fold/hinges 100 and 102. When keyboard section 86 is folded and secured to keyboard section 84, keyboard case 80 can be folded to essentially conform to, cover and thus protect computer 82 by folding over fold/hinge 100 and fold/hinge 102. In this manner, keyboard case 80 can go from an operational keyboard to a protective case for computer 82. A mounting bracket 104 is shown securing computer 82 to keyboard case 80.

Fig. 14 shows a cross-sectional view of an exemplary mounting bracket 104. Mounting bracket 104 has a pivoting base 106 that is secured to keyboard case 80 (not shown) via a pivoting means 108. In an exemplary embodiment, pivoting means 108 is a rivet type fastener that serves to both secure mounting bracket 104 to keyboard case 80 and allow mounting bracket 104 to pivot. This allows a computer 82 mounted upon mounting bracket 104 to rotate or pivot about a point on the computer section. When pivoted, computer 82 can assume a posture so that the screen 110 of computer 82 can be viewed while a user is typing information on keyboard sections 84 and 86.

Computer 82 is secured to connector 104 by inserting computer 82 underneath lip 112. Lip 112 retains the upper portion of computer 82 and prevents it from being lifted out. Lower section 114 of mounting bracket 104 provides a pressure/friction fit so that when a computer 82 is inserted into mounting bracket 104, the pressure of lower section 114 against the bottom portion of computer 82 maintains computer 82 in mounting bracket 104, while allowing for easy insertion and removal. Lower section 114 has a perpendicular extension or foot 116 that applies the pressure to an inserted computer 82. An electrical connector (not shown) is inserted in opening 118 to allow for an appropriate connector to mate with the particular computer 82 being inserted into connector 104. Spring clips 120 and 122 may be used in an exemplary embodiment to retain a connector (not shown) and keep it securely mounted to mounting bracket 104. Horizontal base section 120 allows computer 82 to remain securely mounted in mounting bracket 104 and pivot with mounting bracket 104. An infrared port opening 126 may be included for those computers having infrared ports at the upper center portion of PC 82. An opening 128 is provided within horizontal base section 124 to allow wires

for the electrical connector (not shown) to pass through to a printed circuit board (not shown) mounted below mounting bracket 104.

There is shown in Fig. 15 a bottom view of mounting bracket 104 mounted on a case section 130 of keyboard case 80. A printed circuit board 132 is shown attached to the bottom of mounting bracket 104.

Fig. 16 shows an exploded view of an exemplary mounting bracket 104 and supporting structures. A base housing 132 is attached to case section 130. A rotation ring 134 is a part of or attached to base housing 132. A printed circuit board (PCB) 136 is sandwiched between base housing 132 and upper housing 142. Printed circuit board 136 is fitted between the housing sections in such a manner as to not interfere with the rotation around rotation ring 134.

In an exemplary embodiment, printed circuit board 136 contains control circuitry which serves to detect electrical signals designating keystrokes on keyboard sections 84 and 86. The control circuitry then converts or translates the electrical keystroke signals into electrical signals in a format that can be accepted or understood by the particular computer 82. For many palm PC type of computers, the keyboard signals are converted into serial communication signals which can be accepted by the palm PC computer. A COP8SAA7 processor by National Semiconductor can be used on printed circuit board 136 to carry out the detection and translation processing for the present invention. Appropriate programming for the processor to carry out the detection and translation of the keystrokes is provided for the processor and application used.

An example of the process flow for such a program is shown in flow chart form as flow chart 170 in Fig. 18. Once the processor is initialized in block 172, process control moves to block 174 where the keyboard is scanned and the keyboard image or state is saved into a first buffer (memory storage locations). This scan of the keyboard serves as a reference for comparison against a subsequent scan. Processing then moves to block 176 where the keyboard is again scanned and compared against the previous saved scan of the keyboard. If there is no difference between the two scans, processing returns to block 176 and the keyboard is rescanned. If there is a difference between the scans, then two possibilities may have occurred. The first is that a key on the keyboard has been

depressed and processing moves to block 180 where a code corresponding to the depressed key is saved into a depressed key buffer. The code may be the row and column identifiers from the keyboard matrix that identifies a particular key. The other possibility is that a previously depressed key has been released. If this is the case, processing moves to block 182 where a code corresponding to the released key is saved in the released key buffer.

The data stored in the depressed key buffer and/or the released key buffer is then converted or translated into the appropriate communication protocol such as an asynchronous serial data stream at EIA-232 or EIA-562 voltage and current levels, as shown in block 184. The keyboard is then rescanned in block 186 and a new keyboard image is saved to be used for comparison when processing is transferred back to block 176. Keyboard scans take place every 30 milliseconds.

This process of scanning the keyboard and converting the keyboard electrical signals into a format that can be used by the receiving computer is similar to that carried out in the circuitry of a standard keyboard for a desktop or personal computer (PC).

While the exemplary embodiment monitors the keyboard for both depressed and released keys, it is possible that information for only depressed or released keys can be monitored. By saving and sanding both depressed and released key information to computer 82, the software on computer 82 can implement the auto repeat function. In an alternative embodiment, the auto repeat function can be programmed or hardwired into the control circuitry on printed circuit board 136.

A driver that is loaded and present on computer 82 is used to receive the keystroke data and process the data, as required, before passing the information on to applications, such as an address book, memo pad, to do list, calendar, word processor, etc. The driver is part of the interface between computer 82 and keyboard case 80 to receive the keystroke signals. Some computers 82 may already have a keyboard driver built into the operating system (OS). The OS for the PALM PC line of computers does not currently have a keyboard driver built into the OS. The driver for a PALM PC type computer 82 for the present invention is implemented as a "hack" and a companion

application. A "hack" for a PALM PC OS is a piece of software that is patched into and takes over from system functions. This is commonly done with PALM PC applications and will be understood by those skilled in the art. In an exemplary embodiment, the keyboard driver takes over from the EvtGetEvent system function. The EvtGetEvent is a central message dispatch function.

The driver translates the stream of incoming depress and release signals into the formats used internally by the OS of the particular computer 82. If the driver function is carried out in the controller circuitry on keyboard case 80, then a different controller would be required for each different computer 82 that is used. The use of a drive loaded on each computer 82 allows the same control circuitry to be used with different computers 82, by loading an appropriate driver onto each different computer 82.

A keyboard driver is used to interpret and translate the stream of signals originating from keyboard sections 84 and 86 and communicated through electrical connector 150 to computer 82. The keyboard driver needs to be setup to communicate with the particular operating system under which the particular computer 82 is running. The keyboard driver is software that is loaded on computer 82. A keyboard driver may be incorporated in some computers 82, while for others, such as the Palm III, it is loaded separately. While the keyboard driver could be built into the control circuitry and control software, it is better loaded onto computer 82, so that it can be customized for the specific computer 82 on which the keyboard driver is to be located.

The keyboard driver also allows the user to customize or map the functions or characters of certain keys. In an alternative embodiment, a user can customize/map the function and/or characters of any key or key combination. In still an additional embodiment, the driver provides an audible sound corresponding to a key being depressed (or released), as membrane keyboards may not have any audible signal that a key has been depressed (or released). This can be a user settable feature.

An example of the process flow for such a driver program is illustrated by the pseudo code shown Fig. 19.

In an exemplary embodiment of the present invention, the control of keyboard sections 84 and 86 is accomplished with software. As will be understood by

those skilled in the art, the controller for keyboard sections 84 and 86 could also be implemented entirely in hardware.

A ribbon cable 138 is connected at a first end to printed circuit board 136 via connector 140. The second end of ribbon cable 140 (not shown) is connected to the switch array of keyboard sections 84 and 86 (not shown). Other connections may also be made at the second end of ribbon cable 140, such as for buttons or switches separate from keyboard sections 84 and 86, depending upon the makeup and function of keyboard case 80. A recess 146 is cut or molded into upper housing 142 to allow rotation ring 134 to pass through and mate with rotation bezel 148 (shown in phantom). In this way, mounting bracket 104 can freely rotate atop upper housing 146 without the need to rotate upper housing 146 or lower housing 130. This also allows printed circuit board 136 and ribbon cable 140 to be fixed and not subject to damage or broken connection due to rotation when a computer 82 is mounted in mounting bracket 104. Computer 82 is mounted upon mounting bracket 104, similar to that described with respect to Fig. 14, using lip 112 and perpendicular extension or foot 116. An optional infrared port opening 126 is also shown. An exemplary electrical connector 150 and electrical connector mount 152 are also shown. Electrical connector 150 is mounted within electrical connector opening 118.

Current computers 82, such as the Palm III™ communicate with asynchronous serial data streams at EIA-232 or EIA-562 voltage and current levels. When computer 82 is mounted upon mounting bracket 104 with its serial communication connector connected to electrical connector 150, computer 82 is in electrical connection with keyboards 85 and 87. While an exemplary wired connection scheme has been illustrated and described, other embodiments with different types of connections can be used, such as infrared and wireless (such as the radio frequency (RF) standard being developed under the reference "Bluetooth"). These non-wired configurations allow for computer 82 to remain in electrical communication with keyboard case 80 when computer 82 is removed from keyboard case 80. Removal of computer 82 while retaining electrical communication with keyboard case 80 allows for varying placements of computer 82 while using the keyboard. If computer 82 has its own peripherals or built in capability to

communicate in this non-wired fashion, then keyboard case 80 requires only transmitting and receiving circuitry for the non-wired signals.

Other types of wired connections can be used with the present invention, as required by the particular computer 82 that is selected. In an alternate embodiment, if a removable configuration is used, a suitable removable mount or electrical connector would be necessary to keep computer 82 in wired communication with keyboard case 80. In addition, removable electrical connectors 150, combined with removable or reprogrammable control circuitry if necessary and/or different drivers for computer 82, allows a user to use the present invention with different computers 82.

There is shown in Fig. 17 an exploded view of the keyboard sections and underlying layers of the present invention. Keyboard sections 84 and 86 are mounted upon a keyboard backing plate 154. Top cardboard 156 and bottom cardboard 158 add rigidity, protection and a mounting surface. Below bottom cardboard 158 is bottom leather 160. Top leather 162 is located underneath the mounting means for PC 82 and constitutes case section 130 shown in previous Figs. The various layers underneath keyboard sections 84 and 86 shown in Fig. 17 comprise a layered substrate. While cardboard and leather are described as exemplary materials, other materials could also be used as will be understood by those skilled in the art.

In still an additional embodiment (not shown), a securing means is used to maintain keyboard sections 84 and 86 in a flat, substantially rigid position when opened for typing. One such embodiment uses a sliding bar that slides from fully on one keyboard section when folded as a case, to a position where it is partially on each keyboard section to lock the two keyboard sections flat.

While particular embodiments of the present invention are disclosed herein, it is not intended to limit the invention to such disclosure, and changes and modifications maybe incorporated and embody within the scope of the following claims.

What is Claimed:

1. A keyboard/case for a computer comprising:

a case having a keyboard section and a computer section, said keyboard section and said computer section divided by a hinged member;

a mount for attaching said computer to said computer section; and

at least one keyboard; mounted on said keyboard section, said keyboard section in electrical communication with said computer when said computer is mounted on said keyboard section.

2. A keyboard/case in accordance with claim 1 wherein said computer is removable from said keyboard section.

3. A keyboard/case in accordance with claim 1 wherein said keyboard section is further comprised of two keyboard sections, each with a separate keyboard mounted thereon.

4. A keyboard/case in accordance with claim 3 wherein said separate keyboards mounted upon said two keyboard sections comprise a single alphanumeric keyboard.

5. A keyboard/case in accordance with claim 1 wherein said mount is rotatable about a point on said computer section.

6. A keyboard/case in accordance with claim 5 wherein said mount is rotatable to allow said computer, when mounted on said computer section, to be oriented in a way that keystrokes from said keyboard are displayed in a readable orientation on said computer.

7. A keyboard/case in accordance with claim 1 wherein said computer mount further comprises a lip and a foot section for securing said computer in said computer mount.

8. A keyboard/case in accordance with claim 1 wherein said computer mount further comprises an electrical connector for connecting to said computer when

said computer is mounted thereon, said electrical connector connecting said computer to said keyboard.

9. A keyboard/case in accordance with claim 1 wherein said keyboard section has a first side and a second side and is foldable about said hinged member to cover a computer mounted upon said computer section.

10. A keyboard/case in accordance with claim 9 wherein said keyboard is mounted upon said first side of said keyboard section and said second side serves to protect said computer as a case when said keyboard section is folded about said hinged member.

11. A keyboard/case in accordance with claim 1 wherein said computer section is separable from said keyboard section.

12. A keyboard/case in accordance with claim 1 wherein said computer mount is separable from said computer section.

13. A keyboard case in accordance with claim 11 wherein an electrical connection between said computer and said keyboard is maintained when said computer section is separated from said keyboard section.

14. A keyboard case in accordance with claim 12 wherein an electrical connection between said computer and said keyboard is maintained when said computer mount is separated from said computer section.

15. A keyboard/case in accordance with claim 13 wherein said electrical connection is a wireless connection.

16. A keyboard/case in accordance with claim 14 wherein said electrical connection is wireless.

17. A keyboard/case in accordance with claim 1 wherein said keyboard is comprised of membrane keys.

18. A keyboard/case in accordance with claim 1 further comprising securing means to secure said keyboard section when folded about said hinged member, over said computer mounted upon said computer section.

19. A keyboard/case in accordance with claim 3, further comprising locking means to maintain said two keyboard sections in an open, substantially flat position.

20. A keyboard/case in accordance with claim 15 wherein said wireless connection is infrared.

21. A keyboard/case in accordance with claim 15 wherein said wireless connection is radio frequency (RF).

22. A keyboard/case in accordance with claim 16 wherein said wireless connection is infrared.

23. A keyboard/case in accordance with claim 16 wherein said wireless connection is radio frequency (RF).

24. A keyboard/case in accordance with claim 1 wherein said computer is a palm computer.

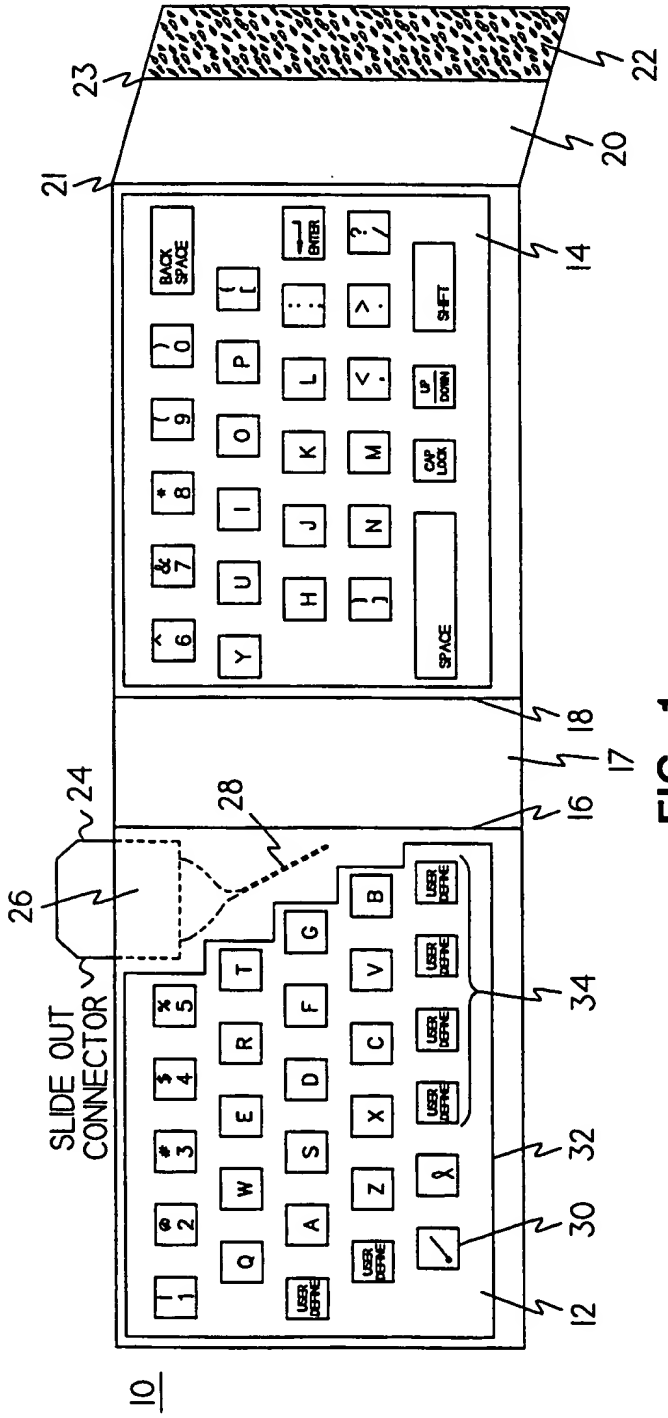
25. A keyboard/case for a palm computer having a top end and a bottom end, said bottom end including a communications port comprising:

a case having a keyboard section divided into two separate keyboard sub-sections, each of said two keyboard sub-sections having a separate keyboard mounted thereon, said keyboards producing electrical signals when a key of said keyboards are operated, and a computer section, said computer section separated from said keyboard section by a hinged member comprised of a fold serving as said hinge;

a mount for attaching said computer to said computer section, said mount comprised of a lip portion to secure said top end of said computer and a foot end for securing said bottom end of said computer to said mount;

an electrical connector positioned at said foot end of said mount that establishes a physical connection with said communications port when said computer is mounted upon said mount; and

electrical connections between said keyboard and said electrical connector to allow communication of said keyboard electrical signals from said keyboard to said computer when said computer is mounted upon said mount.


23
22
21
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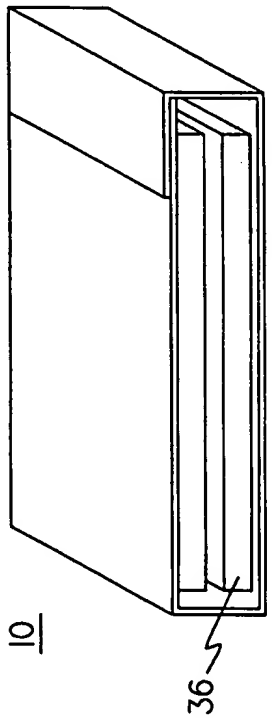
14
18
17
16
24
28
26
SLIDE OUT CONNECTOR
34
32
30
12
10
BACK SPACE
ENTER
SHIFT
SPACE
CAP LOCK
USER DEFINE

FIG. 1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36

FIG. 2

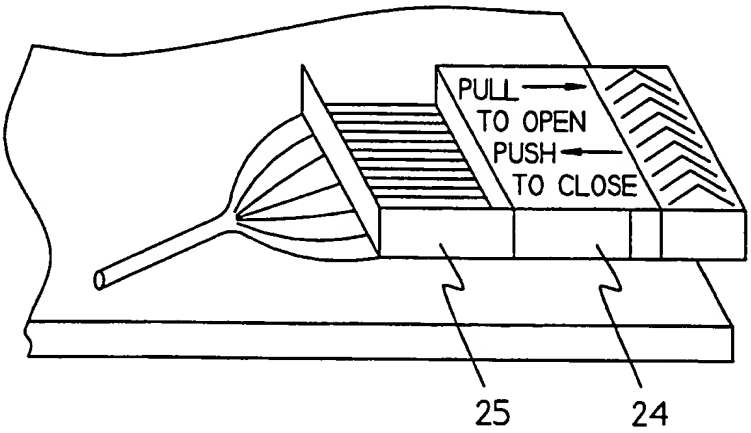


FIG. 3

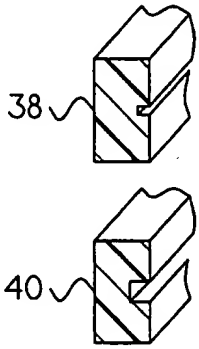


FIG. 4

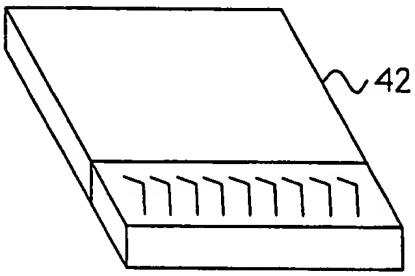


FIG. 5

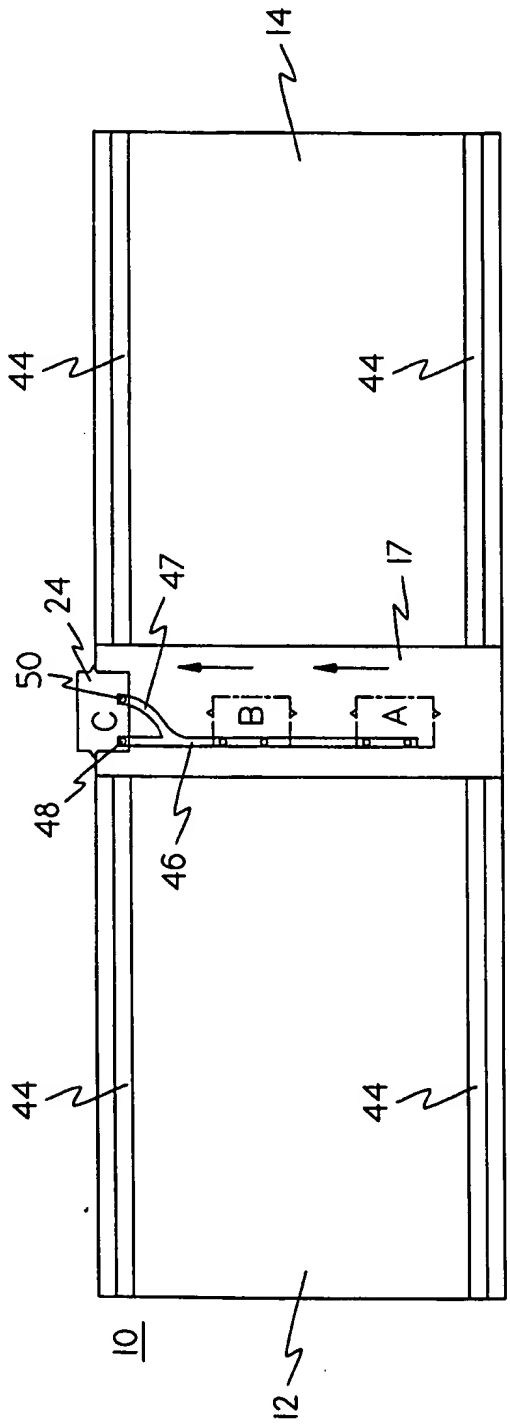


FIG. 6

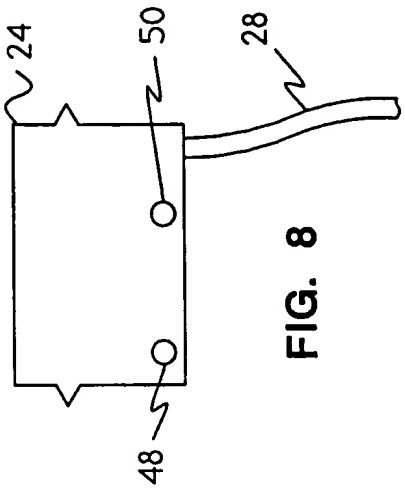


FIG. 8

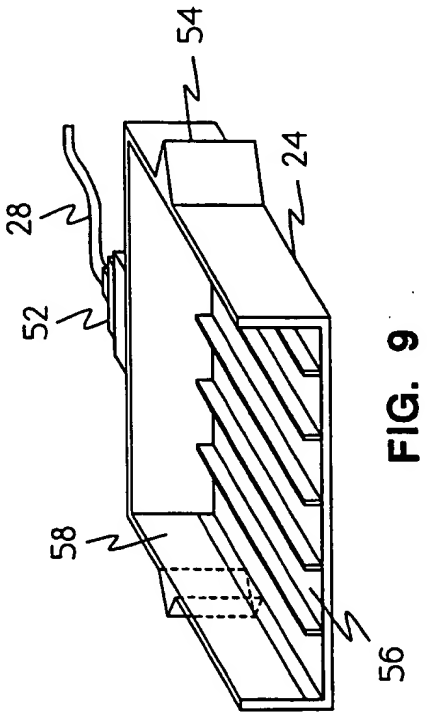


FIG. 9

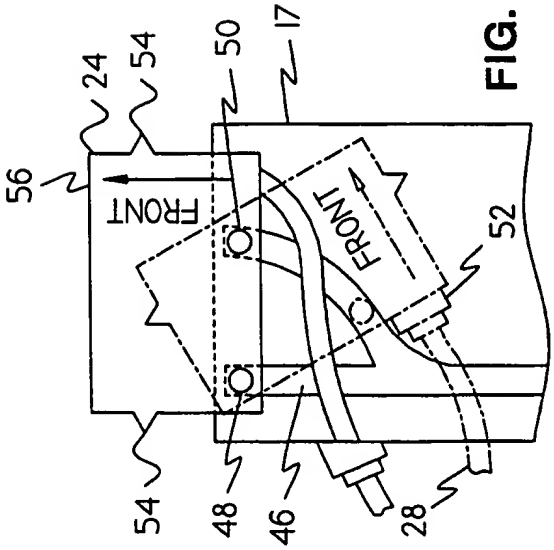


FIG. 7

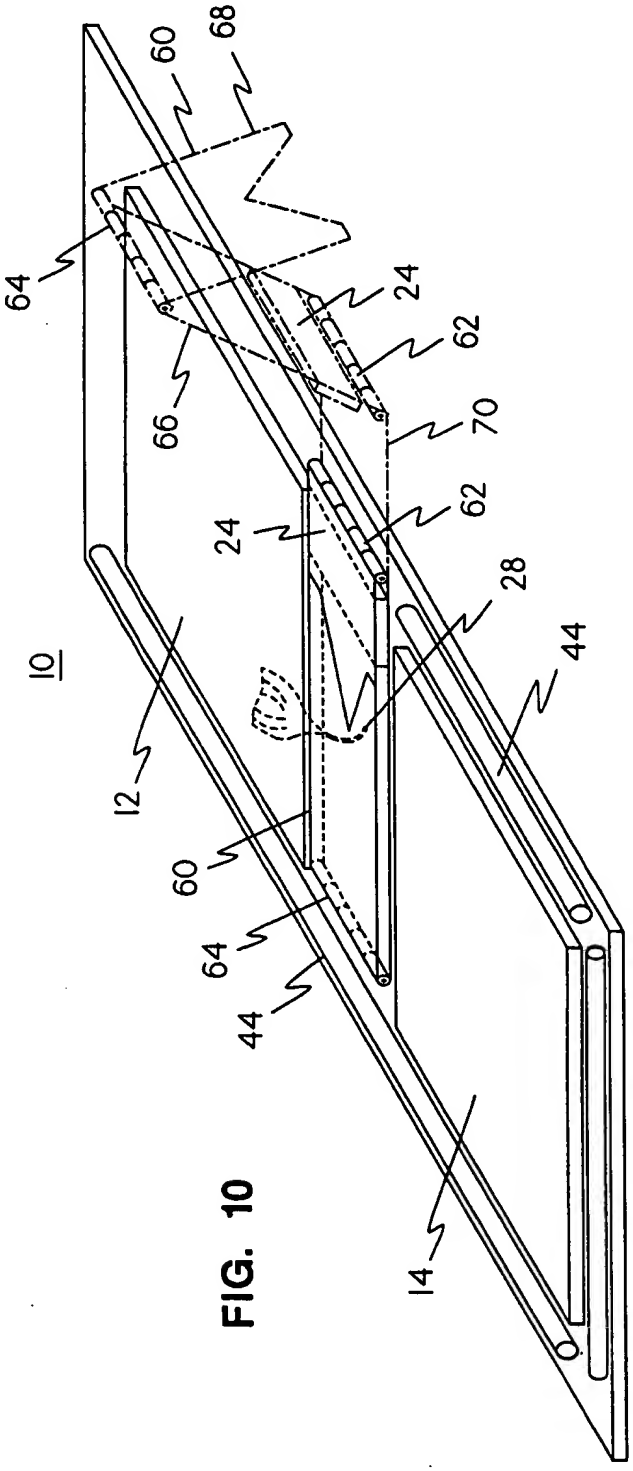


FIG. 10

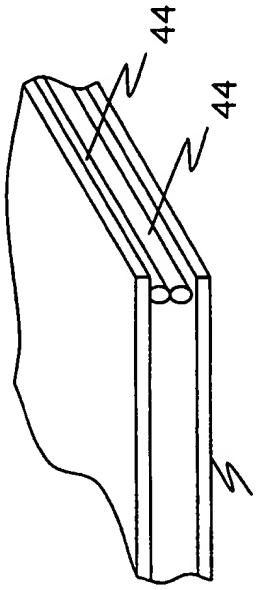


FIG. 11

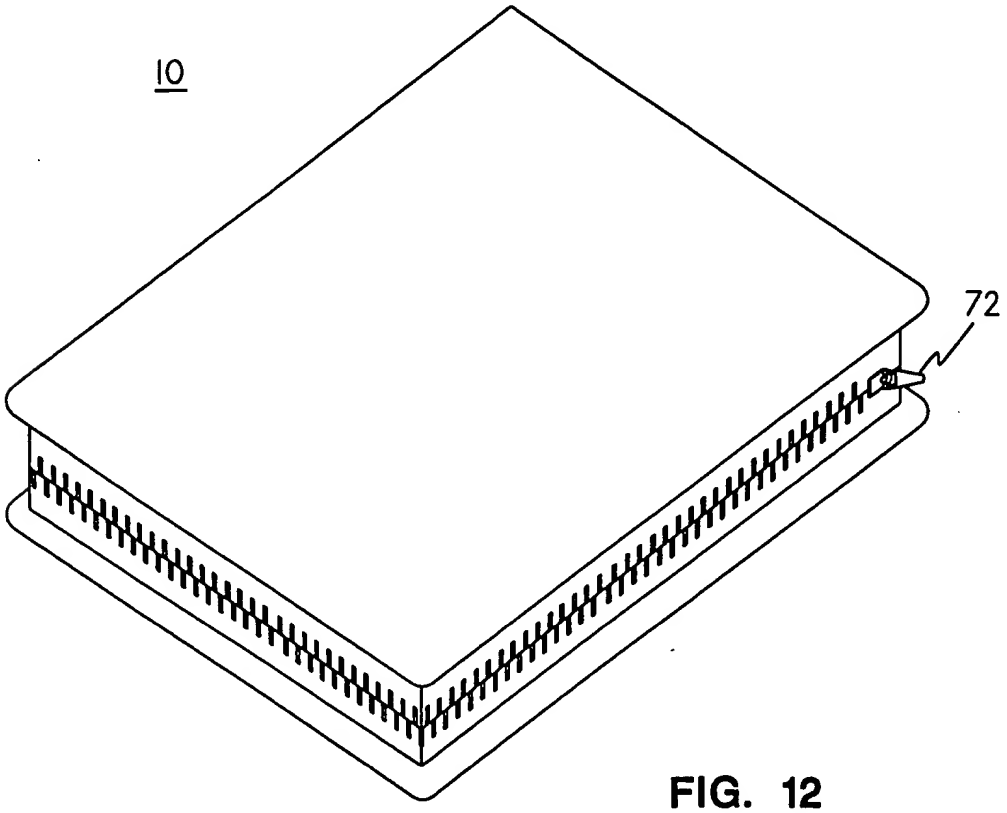
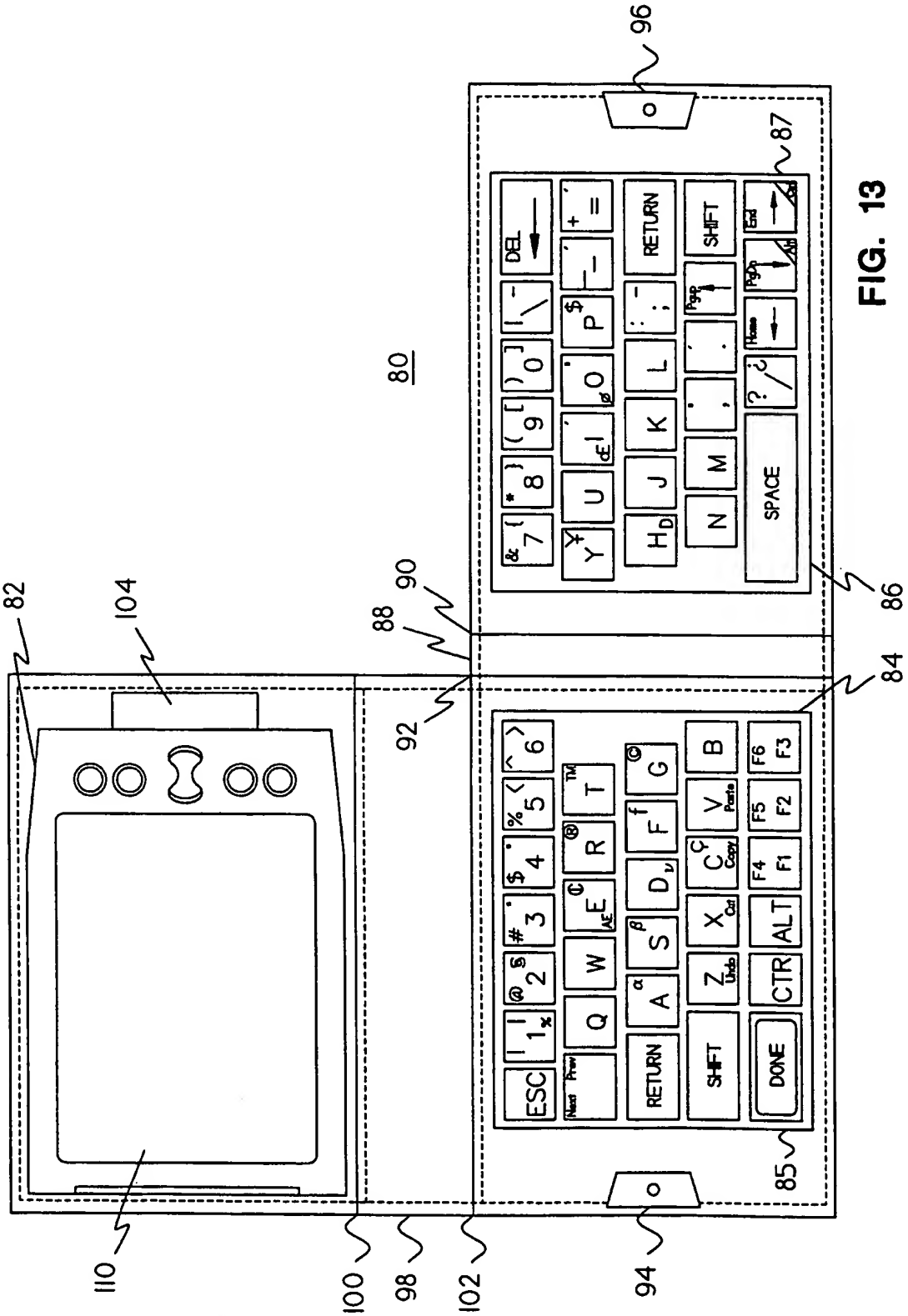


FIG. 12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100
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104
110
ESC
RETURN
SHIFT
DONE
CTR
ALT
SPACE
DEL
RETURN
SHIFT
SPACE

FIG. 13

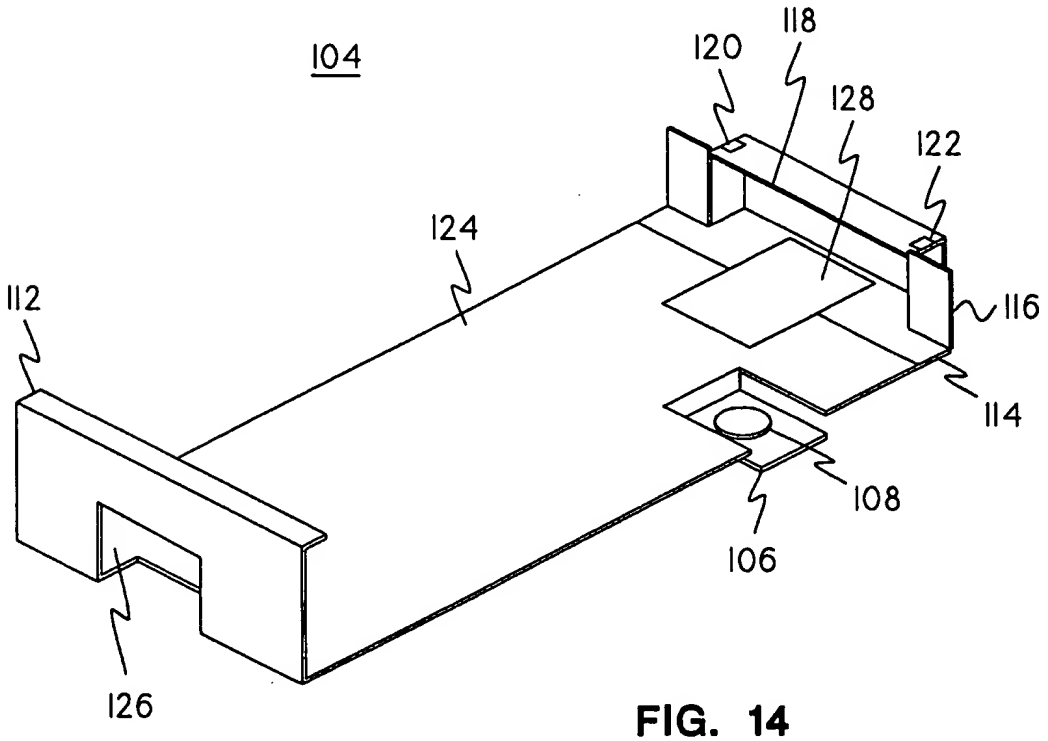

FIG. 14

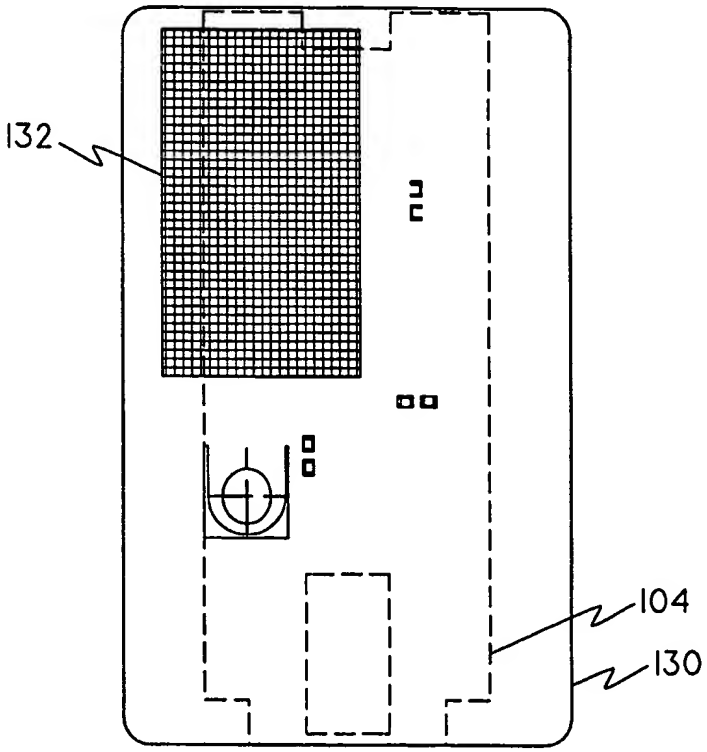

FIG. 15

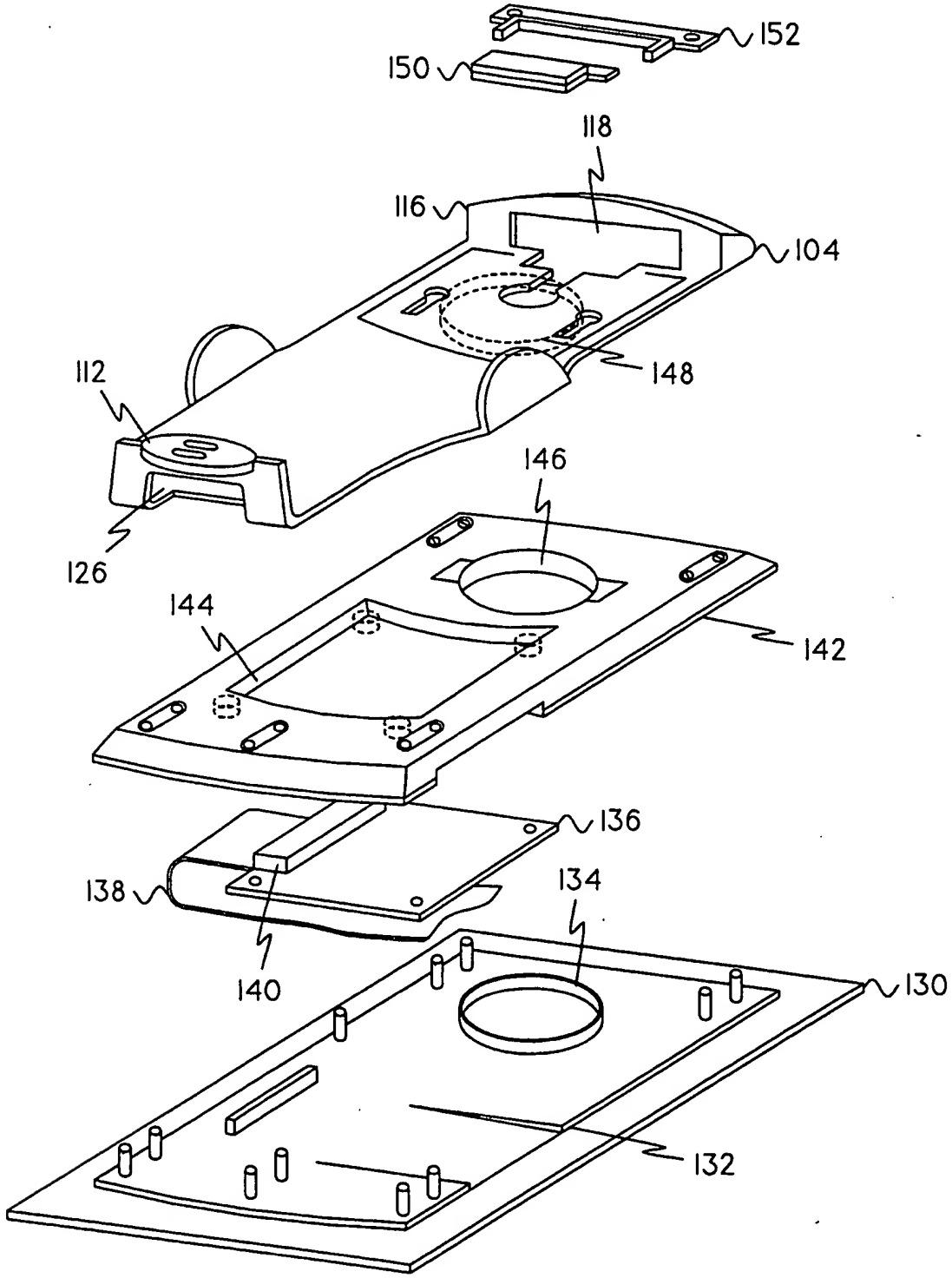
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FIG. 16

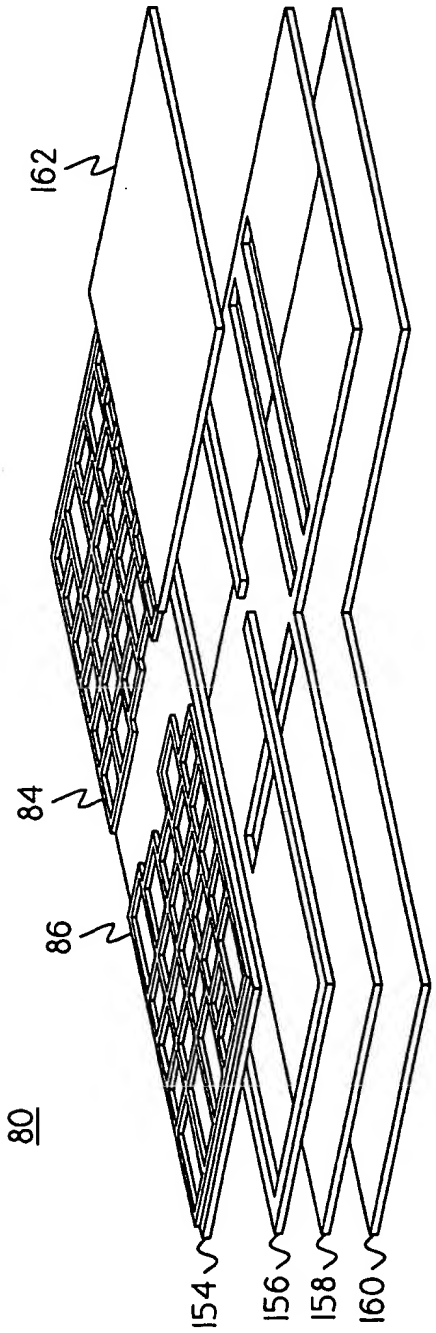

FIG. 17

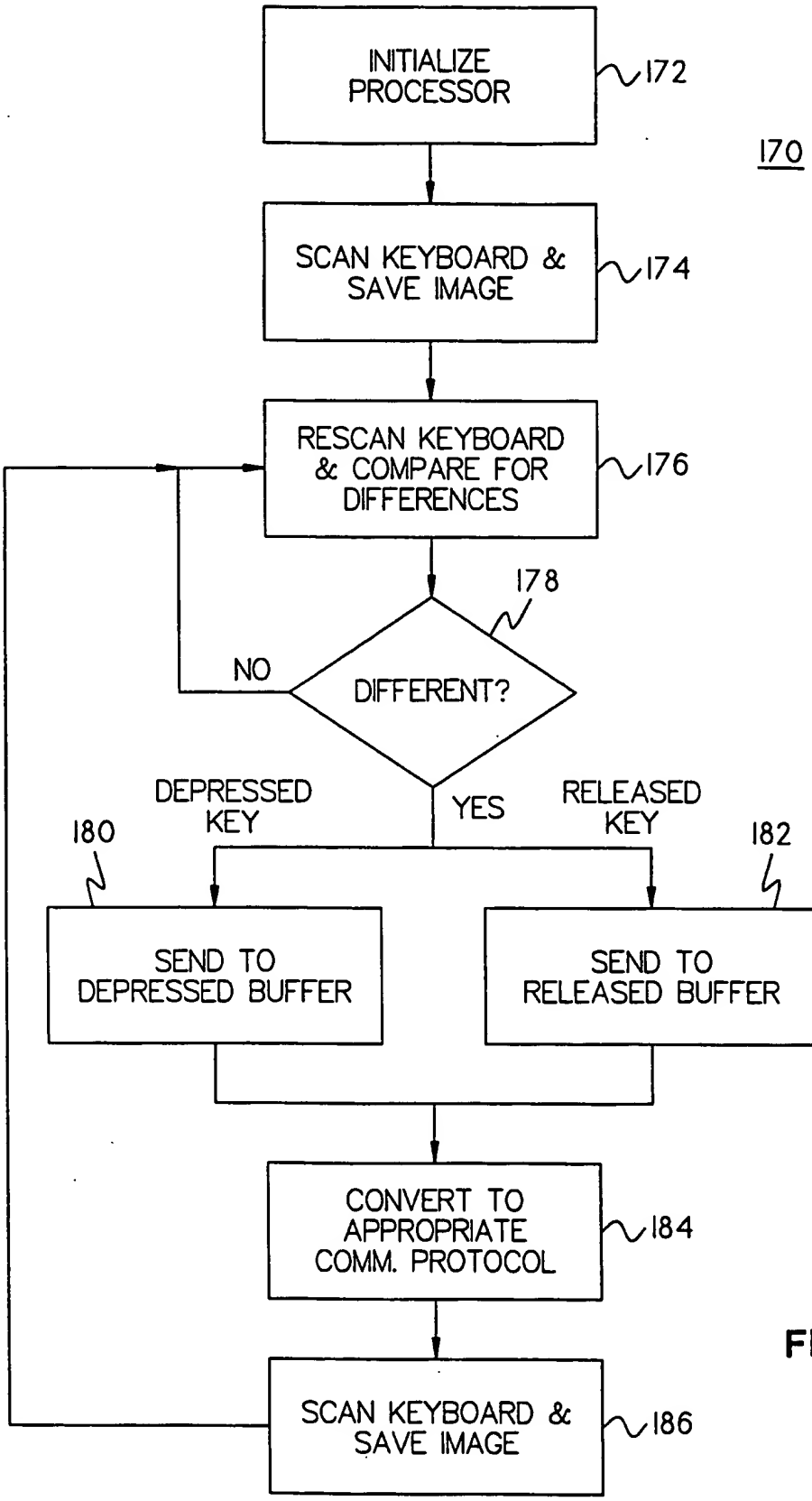
INITIALIZE PROCESSOR
172
170
SCAN KEYBOARD & SAVE IMAGE
174
RESCAN KEYBOARD & COMPARE FOR DIFFERENCES
176
178
DIFFERENT?
NO
YES
DEPRESSED KEY
RELEASED KEY
180
182
SEND TO DEPRESSED BUFFER
SEND TO RELEASED BUFFER
CONVERT TO APPROPRIATE COMM. PROTOCOL
184
SCAN KEYBOARD & SAVE IMAGE
186

FIG. 18

```
If driver is ON
   If it is time to poll
      Send the poll sequence to the serial port
      Calculate next poll time
      Wait 1 character time
      If no character available from keyboard
         increment no response count
         if no response count > limit
            drop rts
            wait 10 ms
            raise rts
            wait 250 ms
            poll for reset sequence
            if no reset sequence
               turn driver off
               gotoexit
            endif no reset
         endif count > limit
         goto exit
      endif no character from keyboard
      if character = idle character
         if repeat key pending
            increment pending polls
            if pending poll > limit
               set repeating a key true
               set pending polls 0
               goto exit
            endif pending > limit
         endif repeat key pending
         if repeating a key
            increment repeat polls
            if repeat polls>limit
               reset repeat polls
               queue the repeat character
               goto exit
            endif repeat polls
         endif repeating a key
               goto exit
         endif idle character
         reset auto off timer
         translate character to keystroke
         if keystroke = shift type key
            save shift states
            goto exit
         endif shift
         if key released bit set
            set repeating a key
            set repeat key pending false
            goto exit
         endif released
         apply shift states to keystroke
         if keystroke is mapped
            invoke the mapped application
            goto exit
         endif
         set repeat key pending true
         queue the keystroke
      endif time to poll
   endif driver on
   exit:
   call original system trap
```

FIG. 19

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